

Q19 a pixel electrode on said second interlayer insulating film,
wherein each of the source and the drain regions [have at least one] has a portion
containing oxygen at a concentration of 1×10^{19} atoms/cm³ or more, and
wherein said channel region contains boron at a concentration of from 1×10^{15} to 5
 $\times 10^{17}$ atoms/cm³.

G20 156. (Amended) A device according to claim 152 wherein said [channel region comprises
boron at a concentration of from 1×10^{15} to 5×10^{17} atoms/cm³] gate electrode comprises a silicon
film containing phosphorus, a multilayer film comprising silicon and molybdenum, or a multilayer
film comprising silicon and tungsten.

REMARKS

The Official Action mailed October 14, 1999 has been received and its contents carefully noted. Claims 78-157 are pending in the present application. Claims 78, 82, 84, 88, 90, 94, 96, 100, 102, 108-110, 116-118, 124-126, 132-134, 138, 140, 144, 146, 150, 152, and 156 are amended herewith and all claims are believed to be in condition for allowance. Favorable reconsideration is respectfully requested for the reasons advanced in detail below.

Paragraph 2 of the Office Action rejects claims 78-103, 105-111, 113-119, 121-127, and 129-133 under 35 U.S.C. 103(a) as being unpatentable over Wilson et al. (U.S. Patent No. 4,755,865) in view of Saito et al. (U.S. Patent No. 4,772,927). This ground of rejection is respectfully traversed for the following reasons.

As amended herewith, the present invention is characterized in that both an n-channel TFT and a p-channel TFT in a CMOS circuit of a semiconductor device comprise a semiconductor layer having a channel region and source and drain regions, wherein said channel region is interposed between the source and drain regions and contains boron at a concentration of from 1×10^{15} to 5×10^{17} atoms/cm³, and wherein each of the source and the drain regions have a portion containing one or more elements selected from the group consisting of carbon, nitrogen, and oxygen at a concentration of 1×10^{19} atoms/cm³ or more as recited in amended claims 78, 84, 90, 96, 134, 140, 146, and 152 (see Figs. 1, 5, 6G, 9C, and 10), or wherein said channel region has least one portion

containing one or more elements selected from the group consisting of carbon, nitrogen, and oxygen at a concentration of 1×10^{19} atoms/cm³ or more as recited in amended claims 102, 110, 118, and 126 (see Figs. 9C, 10, 11 and 12).

In particular, the claims have been amended to include the feature of the channel region containing boron at a concentration of from 1×10^{15} to 5×10^{17} atoms/cm³. As discussed on page 15, lines 25-29 of the specification. By adding boron to the channel region at the claimed concentration, the threshold voltage of both the n-channel TFT and the p-channel TFT are adjusted to be approximately equivalent.

Neither of the cited references to Wilson et al. or Saito et al. disclose or fairly suggest, either alone or in any proper combination, the claimed feature of a channel region containing boron at a concentration of from 1×10^{15} to 5×10^{17} atoms/cm³. Applicant notes that in order to establish a *prima facie* case of obviousness the prior art relied upon must teach or suggest all of the claimed limitations. MPEP §2142 -2143 stating "to establish a *prima facie* case of obviousness, three basic criteria must be met... Finally, the prior art references (or when combined) must teach or suggest all the claim limitations. Thus, absent teaching or suggesting of a channel region containing boron within the claimed concentration range, it is respectfully submitted that a *prima facie* case of obviousness can not be maintained. For the foregoing reasons, claims 78-103, 105-111, 113-119, 121-127, and 129-133 are believed to allowable. Favorable reconsideration is requested in view of the above remarks.

Paragraph 3 of the Office Action rejects claims 104, 112, 120, 128, and 134-157 under 35 U.S.C. 103(a) as being unpatentable over Wilson et al. in view of Saito et al. and further in view of Higashi et al. (U.S. Patent No. 4,694,317). Claims 134, 140, 146, and 152 have been amended to include the above-defined feature and are believed to be allowable for the same reasons as discussed above. Also, claims 104, 112, 120, 128, 135-139, 141-145, 147-151, and 153-157 depend from any of claims 102, 110, 118, 126, 134, 140, 146, and 152 and are likewise believed to be allowable for the same reasons as discussed above.

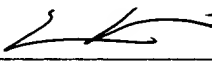
It should be noted that claims 138, 144, 150, and 156 have been amended to include the feature that the gate electrode comprises a silicon film containing phosphorous, a multilayer film comprising silicon and molybdenum, or a multilayer film comprising silicon and tungsten. Support

for this feature may be found in the specification, as originally filed, on page 19, lines 16-20 of the specification.

In view of the above, all of the claims in this case are believed to be in condition for allowance. Should the Examiner deem that any further action by the Applicant would be desirable to place this application in even better condition for issue, the Examiner is respectfully requested to contact the undersigned.

Respectfully submitted,

SIXBEY, FRIEDMAN, LEEDOM & FERGUSON, P.C.



Eric J. Robinson
Registration No. 38,285

EJR:RCC/dkt

Attorney Docket No.: 0756-1626

SIXBEY, FRIEDMAN, LEEDOM & FERGUSON, P.C.
8180 Greensboro Drive, Suite 800
McLean, Virginia 22102
Telephone (703) 790-9110